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THE DOW CHEMICAL COMPANY
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/673,615
Filing Date: September 29, 2003
Appellant(s): RAMANATHAN ET AL.

Norman L. Sims
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 6, 2006 appealing from the Office action mailed December 5, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 5,928,745	WOOD et al	7-1999
US 6,454,114	STRAETZ	9-2002
US 5,539,070	ZHAROV et al	7-1996
US 6,110,544	YANG et al	8-2000
US 2002/0172788	CHAN et al	11-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-15, 21, 23-26, 29, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood (USPN 5,928,745) in view of Zharov (USPN 5,539,070).

Wood et al teach a fuel tank comprising a core layer of a fuel barrier polymer including fluoropolymers, polyamides polyesters or polyether ketones, etc. (col.5, ll.13-39 and col.6, ll.44-52) and a thermoplastic extrusion of HDPE on the inner and outer layer surrounding the barrier core layer (col.4, ll.59-64). The fuel tank comprises two or more sections bonded together with an adhesive that bonds to the thermoplastic resins used to form the fuel tank (col.7, ll.57-61). As defined by the instant specification high density polyethylene is a low surface energy material. Therefore, because Wood et al teach adhesive bonding of the fuel tanks made of high density polyethylene, Wood et al inherently teach that the adhesive bonds low energy surface materials. Little patentable weight is given to the shape of the sections before being used to form the fuel tank; the same structure of the fuel tank is achievable regardless of what the shape of the individual sections was before bonding together to form the tank. Similarly, no patentable weight is given to the process of forming the individual sections. The sections are formed by blown thermoplastic extrusion, solvent casting, thermoforming, blow molding, or injection molding. Little patentable weight is given to the process of forming the fuel tank and Wood et al teach that the tank is made as a single unit (col.7, ll.57-58). Wood et al teach a filler tube and fuel

line, which are components having a first open end and a second open end, the first open end extending outwardly through an opening in the tank wall, and the second open end extending inwardly into the tank until it is in contact with the periphery of the tank wall opening and obviously bonded thereto by an adhesive because it must be bonded to the tank wall opening in order to function as a filler tube or fuel line for the fuel tank and adhesive bonding is taught by Wood et al as a method of bonding parts of the fuel tank together.

Wood et al fail to teach that the adhesive has a lap shear strength of about 400 psi or greater and which does not require surface pretreatment of the low surface energy materials or that the adhesive comprises an amine/organoborane complex. However, Zharov et al teach several organoborane/amine complexes used for acrylic adhesives that are embraced by the instant claims when both R^1 and R^2 are alkyl and 'b' equals 0 and 'a' equals 1, especially compounds 6, 9, etc. (col.12, table 1). The adhesive composition with organoborane amine complex initiator are used for bonding low surface energy substrates such as polyethylene that otherwise requires costly surface preparation techniques (col.4, ll.1-6). An adhesive with the same composition and make up will have the same characteristics including having a lap shear strength of about 400 psi or greater, supporting a load of

1334 Newtons and having a fuel vapor permeation rate of not more than 46g-mm/m^2/day. One of ordinary skill in the art would have recognized that amine-organoborane complex containing adhesives are substituted for other adhesives when the adhesive is used to bond low surface energy substrates such as polyethylene, because unlike other known adhesives the adhesive containing amine-organoborane complex can be bonded effectively to low surface energy materials without the need for costly substrate surface preparation techniques, as taught by Zharov et al, especially in column 1, lines 18-60 and column 4, lines 1-6.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to use an adhesive comprising an amine/organoborane complex, which will have the same properties as the claimed adhesive since the adhesive is the same composition, taught by Zharov et al as the adhesive joining sections of a fuel tank together to form the tank of Wood et al because the adhesive comprising an amine/organoborane complex is useful for bonding low surface energy substrates without costly surface preparation including polyethylene, which is commonly used to form fuel tanks, as taught by Zharov et al. An adhesive that bonds low surface energy substrates without costly surface preparation techniques will cut production costs.

Especially with regards to claims 21 and 23-26, it would have been obvious to use the adhesive of Zharov to bond components to the fuel tank of Wood et al since Wood et al teach each a fuel tank assembly comprising a fuel tank and fuel tank components including fuel pump, fuel line, an instrument opening, a filler tube and mounting flanges made up of any composition including polymers or steel, which are the known materials used in the art of fuel tank components (col.3, ll.59-61), but fails to explicitly teach a means for attaching the components to the tank. However, Wood et al teach joining tank sections to form a tank by hot melt adhesives or thermosetting adhesives (col.3, ll.51-54). One of ordinary skill in the art would have recognized that adhesives are also used to join fuel components to the fuel tank if adhesives are used to join sections of the fuel tank to form the tank. Also it would have been obvious to one of ordinary skill in the art to add a second seal of adhesive to a primary seal when joining components to the fuel tank in order to increase sealability.

Therefore, it would have been obvious to one of ordinary skill in the art at the time that applicant's invention was made to join fuel tank components by means of the adhesive of Zharov to the fuel tank made from adhesively joined sections and to add a second seal to the primary seal in order to increase

sealability. Additionally, note that the method of making an article receives little patentable weight in article claims, and therefore how the components are joined to the fuel tank receives little patentable weight. Joining the components by a different method other than adhesive serves the same function and therefore any method of permanent sealing of the component to the fuel tank such as welding performs the equivalent function of permanently sealing the two articles together and determining which method to use is within the level of ordinary skill in the art, absent the showing of unexpected result.

Claims 1-15, 21, 23-26, 29, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Straetz (USPN 6,545,114) in view of Zharov (USPN 5,539,070).
Straetz teaches a fuel tank comprising a core layer of a fuel barrier polymer including polyamides (col.2, ll.10-12) and a carrier material of HDPE on the inner and outer layer surrounding the barrier core layer (col.2, ll.8-10). The fuel tank comprises two or more sections bonded together with an adhesive that bonds to the thermoplastic resins used to form the fuel tank, which are low energy surface materials (col.2, ll.40-44). Little patentable weight is given to the shape of the sections before being used to form the fuel tank, the same

structure of the fuel tank is achievable regardless of what the shape of the individual sections was before bonded together to form the tank. Similarly, Little patentable weight is given to the process of forming the individual sections. The sections are clam shells (fig.2) formed by co-extrusion blow molding (col.1, ll.63-66). The tank is manufactured with additional fittings attached or installed in the halves (col.3, ll.31-40). Straetz teaches that the components are attached to the tank by adhesion because he teaches that connections when forming the fuel tank are either welded or adhesive bonded. The fuel tank components are obviously made up of thermoplastic or thermosetting polymers or steel including polyethylene because the fuel tank itself is composed of polyethylene and the claimed materials are all well known in the art of fuel tanks and fuel tank components.

Straetz fails to teach that the adhesive has a lap shear strength of about 400 psi or greater and which does not require surface pretreatment of the low surface energy materials or that the adhesive comprises an amine/organoborane complex. However, Zharov et al teach several organoborane/amine complexes used for acrylic adhesives that are embraced by the instant claims when both R^1 and R^2 are alkyl and 'b' equals 0 and 'a' equals 1, especially compounds 6, 9, etc. (col.12, table 1). The adhesive

composition with organoborane amine complex initiator are used for bonding low surface energy substrates such as polyethylene that otherwise requires costly surface preparation techniques (col.4, ll.1-6). An adhesive with the same composition and make up will have the same characteristics including having a lap shear strength of about 400 psi or greater, supporting a load of 1334 Newtons and having a fuel vapor permeation rate of not more than 46g-mm/m^2/day. One of ordinary skill in the art would have recognized that amine-organoborane complex containing adhesives are substituted for other adhesives when the adhesive is used to bond low surface energy substrates such as polyethylene, because unlike other known adhesives the adhesive containing amine-organoborane complex can be bonded effectively to low surface energy materials without the need for costly substrate surface preparation techniques, as taught by Zharov et al, especially in column 1, lines 18-60 and column 4, lines 1-6.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to use an adhesive comprising an amine/organoborane complex, which will have the same properties as the claimed adhesive since the adhesive is the same composition, taught by Zharov et al as the adhesive joining sections of a fuel tank together to form the tank of Straetz because the adhesive comprising an

amine/organoborane complex is useful for bonding low surface energy substrates without costly surface preparation including polyethylene, which is commonly used to form fuel tanks, as taught by Zharov et al. An adhesive that bonds low surface energy substrates without costly surface preparation techniques will cut production costs.

Especially with regard to claims 21 and 23-26, it would be obvious to use the adhesive of Zharov to bond the fuel tank components of Straetz to the fuel tank of Straetz. Straetz teaches a fuel tank assembly comprising a fuel tank and fuel tank components including fuel pump, fuel line, an instrument opening, a filler tube and mounting flanges made up of any composition including polymers or steel, which are the known materials used in the art of fuel tank components (col.3, ll.59-61), but fails to explicitly teach a means for attaching the components to the tank. However, Straetz teaches joining tank sections to form a tank by means of adhesive bonding (col.2, ll.40-44). One of ordinary skill in the art would have recognized that adhesives are also used to join fuel components to the fuel tank if adhesives are used to join sections of the fuel tank to form the tank. Also it would have been obvious to one of ordinary skill in the art to add a second seal of

adhesive to a primary seal when joining components to the fuel tank in order to increase sealability.

Therefore, it would have been obvious to one of ordinary skill in the art at the time that applicant's invention was made to join fuel tank components by means of the adhesive of Zharov to the fuel tank made from adhesively joined sections and to add a second seal to the primary seal in order to increase sealability. Additionally, note that the method of making an article receives little patentable weight in article claims, and therefore how the components are joined to the fuel tank receives little patentable weight. Joining the components by a different method other than adhesive serves the same function and therefore any method of permanent sealing of the component to the fuel tank such as welding performs the equivalent function of permanently sealing the two articles together and determining which method to use is within the level of ordinary skill in the art, absent the showing of unexpected result.

Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al (USPN 5,928,745) or Straetz (USPN 6,545,114) in view of Zharov (USPN 5,539,070) as applied to claim 21 above, and further in view of Yang et al (USPN 6,110,544).

Wood et al or Straetz in combination with Zharov teach all that is claimed in claim 21 as shown above, but fail to explicitly teach coating the tank and components with a vapor phase plasma coating. However, Yang et al teach vapor phase plasma coating as a method of applying protective coatings on plastic surfaces including shaped articles. The protective coating is deposited material, which provides protection against abrasion and UV degradation and reflects IR radiation (col.1, ll.6-16). One of ordinary skill in the art would have recognized that fuel tanks require protection from UV, IF, and abrasion because fuel tanks are exposed to UV and IF from the sun and the salt, sand, rocks, and other particles on the roads are kicked up by the tires and potentially damage plastic fuel tanks on automobiles and degradation of a fuel tank would lead to leaking of the fuel tank. Therefore, one of ordinary skill in the art would have recognized that a protective coating is useful when forming a fuel tank and that a protective coating is added to fuel tanks in order to protect from abrasion, UV degradation, and IR radiation, as taught by Yang et al.

Thus, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to apply the vapor phase plasma protective coating of Yang et al to the fuel tank of Wood et al or Straetz with Zharov in order to

protect the fuel tank from abrasion, UV degradation, and IR radiation, as taught by Yang et al.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al (USPN 5,928,745) or Straetz (USPN 6,454,114) in view of Zharov (USPN 5,539,070) as shown above and further in view of Chan et al (US 2002/0172788 A1).

Wood et al or Straetz in view of Zharov teach a fuel tank assembly comprising a plastic fuel tank having a wall with an outwardly extending cylindrical opening and comprising a multilayer structure having inner and outer layers of untreated low energy surface materials and a fuel barrier layer there between and plastic components attached or joined to the fuel tank wall along the periphery of the fuel tank wall opening by means of an adhesive, which is capable of bonding to untreated low energy surface materials, having adequate structural strength, fuel resistance, sealing and vapor emission properties (as discussed above). However, Wood et al or Straetz in combination with Zharov do not explicitly teach the plastic component comprising a multilayer structure. However, Chan et al teach components for fuel containers having a single-layered structure or a multi-layered structure that comprises an inner

and outer layer of a polyolefin and a barrier layer of a barrier resin including polyamide (p.15, col.1, ll.1-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a multi-layered structure comprising a barrier material for the fuel components attached to the fuel tank by adhesive in Wood et al or Straetz with Zharov, in order to lower vapor emission properties as taught by Chan et al.

(10) Response to Argument

Appellant argues that the Final Rejection has not established sufficient motivation to combine the teachings of the references specifically that there is no teaching or suggestion that the adhesives described in Zharov have acceptable properties for bonding fuel tanks. Appellant argues neither Wood nor Straetz teaches adhering low surface energy materials. Appellant argues that neither Wood nor Straetz teach that parts are bonded by adhesive to the fuel tank. Appellants argue there is no motivation to substitute Zharov for the adhesives in Wood without a teaching of all of the properties claimed by applicant. Appellant argues that Wood and Straetz do not provide an enabling teaching as to appropriate adhesives and means of utilizing adhesives to bond fuel tank parts together.

Appellant argues that Zharov does not teach the same adhesive composition as claimed.

Appellant's argument that there is a lack of sufficient motivation to combine the references is not persuasive. First, although it is admitted that Zharov does not specifically teach using the adhesive to bond fuel tanks together, one of ordinary skill in the art would be motivated to combine the teachings of the references because Wood and Straetz teach using adhesive to bond fuel tanks made of polyethylene or polypropylene and Zharov teaches using this particular adhesive to bond polyethylene and polypropylene articles. In particular, Zharov discusses bonding injection molded pieces, which would require similar strength requirements as a fuel tank. One of ordinary skill in the art would look to teachings of adhesives that bond articles formed from polyethylene and polypropylene when attempting to form the articles of Wood and Straetz using adhesives. Second, the fact that commercially all fuel tanks are bonded together using welding and not adhesives described in the Declaration of Toni Ristoski, is not relevant to the question of nonobviousness because Wood and Straetz specifically teach that fuel tanks are bonded by use of adhesive. Third, the argument that there is no evidence presented that the adhesives of Wood are equivalent to the adhesives of Zharov is not persuasive because Wood teaches

only broad examples of useful adhesives and the only properties required for the adhesive of Wood is that it forms a strong bond between the sections of the fuel tank. Zharov teaches that strong shear strengths greater than 400 psi are formed between the adhesive of Zharov and polyethylene and other low energy surfaces as shown in the examples. Therefore, it would have been obvious to one having ordinary skill in the art that the adhesive of Zharov would meet the properties required of Wood such as shear strength since Zharov teaches that the adhesive forms strong bonds with low energy surfaces. Fourth, Zharov teaches in the examples that the shear strength between polyethylene and the adhesive is greater than 400 psi and the other properties would be latent properties of the adhesive because it is the same adhesive used in the claimed invention. However, the motivation to substitute the adhesive of Zharov for the adhesives of Wood is in the fact that Zharov's adhesive allows the costly pretreatment steps to be eliminated while maintaining the requisite bond or shear strength required by Wood and the claimed invention because Zharov teaches the shear strength is greater than 400 psi in the examples.

In response to Appellant's argument that neither Wood nor Straetz teach adhering low surface energy materials, high density polyethylene is a low surface energy surfaced material

and therefore Wood teaches using adhesive to bond a low surface energy surfaced material. However, the point is taken that once the surface is treated is no longer has a low surface energy. However, because the rejection is a 103 rejection including Zharov the statement is correct insofar as the adhesive used as taught by Zharov does not require a surface treatment and therefore the surface energy remains low when the Zharov adhesive is used.

In response to Appellant's argument that neither Wood nor Straetz teach bonding the fuel components to the fuel tank by adhesive, one of ordinary skill in the art would have recognized that if adhesive is sufficient to combine two halves of a fuel tank together without losing strength or leaking than adhesive would also be sufficient to combine fuel components to the fuel tank.

In response to Appellant's argument that it appears that the final rejection is saying that because adhesives disclosed in Zharov have similar properties to the adhesives claimed as useful in Applicant's invention, it is therefore obvious to combine the teachings of Zharov and Wood, the motivation to combine is separate from this argument. The Final rejection is saying that the motivation to combine is the fact that Wood teaches that an adhesive is used to bond the polyethylene or

polypropylene tank portions together to form the tank and that Zharov teach that the particular adhesives taught in Zharov are substituted for previously known adhesives for bonding polyethylene or polypropylene portions of a container together because it eliminates the required surface treatment steps of other previously known and used adhesives. The argument then follows that because the adhesive of Zharov is similar or the same as the claimed adhesive the properties of the adhesive as they relate to the formation of the tank of Wood or Straetz would be the same as the claimed properties, since the same material must have the same properties.

In response to Appellant's argument that Wood and Straetz do not provide an enabling teaching for bonding fuel tank parts by adhesive, when the reference relied on expressly anticipates or makes obvious all of the elements of the claimed invention, the reference is presumed to be operable. The burden is on appellant to provide facts rebutting the presumption of operability, which the appellant has not in this case.

In response to Appellant's argument that shear strength alone is not a sufficient property for determining whether an adhesive is adequate for bonding fuel tanks together, the combination of teaching provided explicitly and implicitly from the references including the fact that it is known to bond fuel

tanks together by adhesive, that the adhesive of Zharov is used in place of other known adhesives for bonding polyolefins because it avoids the requirement of costly pretreatment of the polyolefin, and the fact that the shear strength of the adhesive of Zharov is sufficiently strong is enough motivation for one of ordinary skill in the art without explicit teaching of every required property for bonding of fuel tanks.

In response to Appellant's argument that Zharov does not teach the same adhesive composition as claimed in claims 8-13, Zharov et al teach several organoborane/amine complexes used for acrylic adhesives that are embraced by the instant claims when both R^1 and R^2 are alkyl and 'b' equals 0 and 'a' equals 1, especially compounds 6, 9, etc. (col.12, table 1). Appellant has provided no explanation for why the adhesive taught in Zharov is not the same adhesive claimed.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Christopher P Bruenjes
Examiner
Art Unit 1772

CPB CPB
August 24, 2007

RENA DYE
SUPERVISORY PATENT EXAMINER
AU 1772
8/24/07

Conferees:

Rena Dye

Romulo Delmendo

Norman L. Sims
THE DOW CHEMICAL COMPANY
INTELLECTUAL PROPERTY SECTION
P.O. Box 1967
Midland, MI 48641-1967